

DEVELOPMENTAL VARIABILITY OF
CORNUS CANADENSIS IN
NORTHERN NEW ENGLAND

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The forms and varieties of *Cornus canadensis* L. have received considerable taxonomic attention with little resulting unanimity. Fernald (1950) recognized f. *elongata* Peck (“. . . pairs of leaves all scattered . . .”) and f. *purpurascens* (Miyabe & Tatewaki) Hara. He also listed \times *C. unalaschkensis* Ledeb., a hybrid of *C. canadensis* and *C. suecica* L., and stated “Innumerable minor forms have been noted.”

Fernald and Wiegand (1911) stated “. . . *Cornus canadensis* L., has the leaves ordinarily closely crowded and appearing whorled at the summit of the nearly naked or only slightly bracted stem.” They depicted *C. canadensis* var. *intermedia* Farr. as having one to three pairs of cauline leaves which were well developed and 1/2 to 1/3 the size of the uppermost leaves. At the time they considered var. *intermedia* to be synonymous with *C. unalaschkensis* Ledeb. and noted that in some characters var. *intermedia* resembled *C. suecica* but the two were distinct.

The forma *elongata* is described by Pack (1911) as possessing an elongated stem “. . . bearing a pair of opposite leaves at each of three or four nearly equidistant nodes, or bearing a whorl of four leaves near the base and two or three pairs of opposite leaves above . . .”; he separated this form from *C. suecica* on the basis of the leaf venation.

Arséne (1927) reported a confusing intermediate form of *C. canadensis* on St. Pierre et Miquelon and listed both *C. canadensis* and *C. suecica* as present. Both species were reported from St. Paul Island by Perry (1931), who mentioned observing what was believed to be the hybrid (\times *C. unalaschkensis*). Erskine (1956) stated that the hybrid

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was found frequently on the same island. Porsild (1939) said that in the rather localized portions of North America where *C. canadensis* and *C. suecica* overlap in range, it is easy to treat var. *intermedia* as a hybrid of the two. But, he cited Fernald as mentioning that in many parts of its range "*Cornus canadensis* L. var. *intermedia* is common or occasional . . . more than a thousand kilometers from the nearest station of *C. suecica*."

The following were listed by Lepage (1946) as synonymous with the hybrid *C. canadensis* L. \times *C. suecica* L.: *C. unalaschkensis*, *C. canadensis* var. *intermedia* and *C. canadensis* var. *alpestris* House. Later Lepage (1950) established the forma *alpestris* based on his collections of plants which had both the typical branch and the f. *alpestris* branch growing from the same rhizome. He called the entire plant f. *alpestris*. Smith and Schofield (1952) found both *C. canadensis* and *C. suecica* growing together abundantly in Cape Breton county, yet they reported the hybrid not present.

Several forms of *C. canadensis* were cited for Minnesota (Lakela, 1948) as ". . . ecological variants differing vegetatively from the typical form. . .".

In 1967, on Mt. Washington, New Hampshire, I collected several plants of what appeared to be *C. canadensis* f. *elongata* with ". . . pairs of leaves all scattered . . ." Fernald (1950). During that summer and fall, further observations of *C. canadensis* in northern New England gave the impression of significant developmental variability. Closer inspection revealed that some of these elongated plants were growing from the same rhizome as adjacent, more typical plants of *C. canadensis* (Fig. 1.). Similar rhizomes with both upright forms were located on the east, south and western slopes of Mt. Washington. The plants occurred primarily between 4,200 ft. and 5,000 ft. above sea level in the zone of spruce-fir scrub. Below this elevation *C. canadensis* occurred primarily as the typical form, although occasional aberrant individuals appeared in all areas of northern New England. Several rhizomes, each bearing the two forms,

PLATE 1381

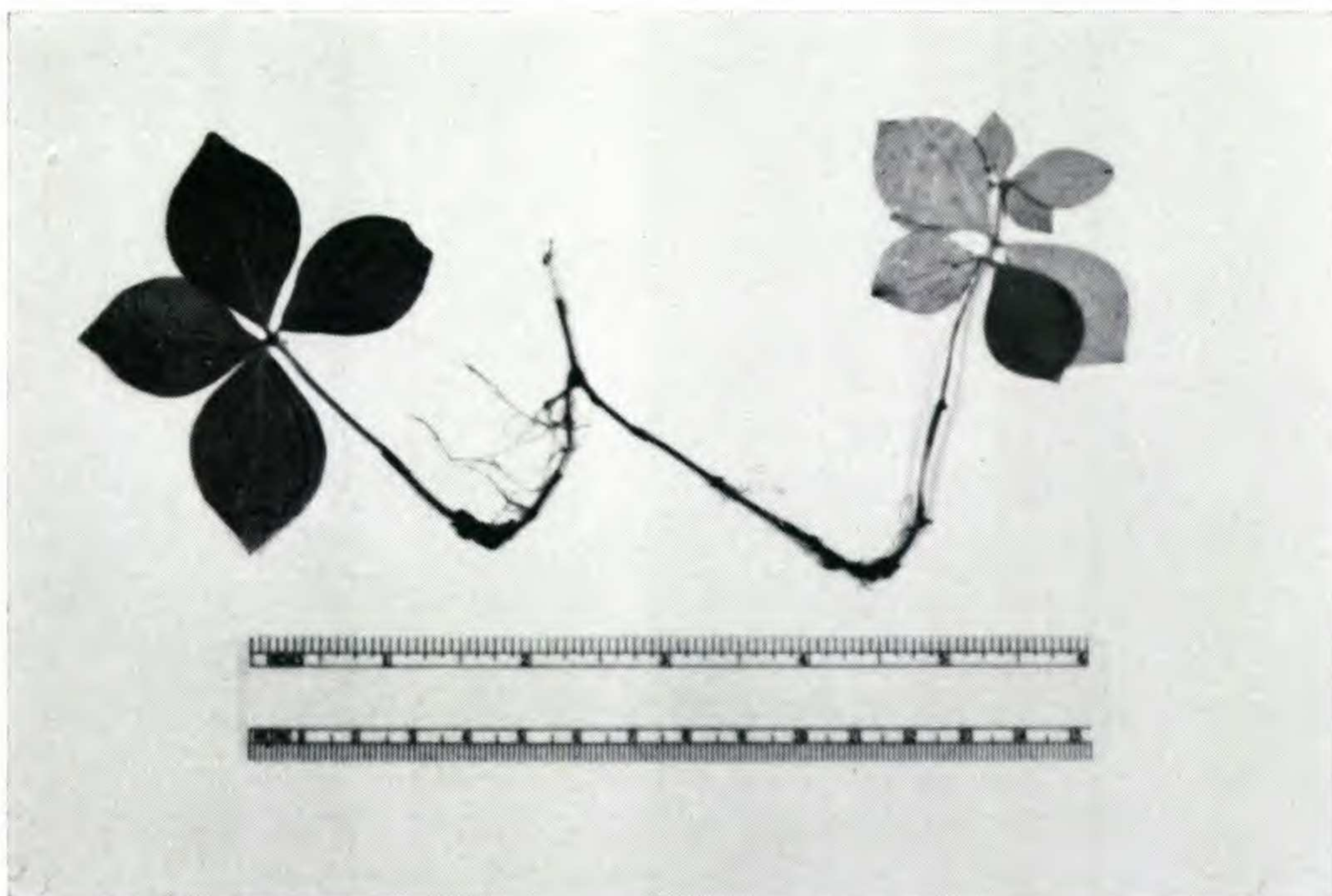


Fig. 1. A single rhizome of *Cornus canadensis* bearing stems of the typical and elongate forms; collected on Mt. Washington, N.H., about 4,500' above sea level in spruce-fir scrub.

were collected at West Quoddy Head, Lubec, Maine, at 20 ft. above sea level.

In many locations on Mt. Washington, in addition to mixed colonies, pure colonies of either the elongated form or the typical form were found throughout the scrub zone. Both forms could be found in pure and mixed colonies at the upper altitudinal limit of the species. Stems which developed later in the growing season (late July and August) tended to be of the elongated form; these late-developing plants were usually strictly vegetative. When an inflorescence was present, parts were frequently deformed (i.e. grossly uneven bracts, clustered misshapen peduncles). The opposite cauline leaves varied in size from $1/8$ to $3/4$ the size of the typical terminal leaves (which also vary considerably in size).

Flowering and vegetative development of many temperate region plants is often correlated with periods of high

temperature during the growing season. Walker (1957), discussing frost injury to garden peas, noted that when an apical meristem was killed, basal dormant buds often responded with elongated internode growth. If lower temperature is to be correlated with abnormal development and failure of flowering in bunchberry, then the most frequent occurrence of aberrant plants would be expected in the cooler parts of the range, along with occasional late-starting aberrants throughout the range. This agrees with the present observations. It is of interest that Peck's (1911) collections of f. *elongata* are both from cool sites "Cranberry marsh, . . . and Averyville marsh . . ." in New York. House (1924) described another morphologic aberrant of *C. canadensis*, var. *alpestris*, as "In both localities growing among rocks beneath which ice persists throughout most of the summer."

The many other possible causes of aberrations cannot be generally excluded and it is doubtless true that other factors, in addition to low temperature, can contribute to the phenotypic confusion of *C. canadensis*. However, the fact that frequent developmental aberrants appear primarily in cool sites in the range strongly suggests the temperature relationship.

Future studies of this group should consider developmental aberrations as well as genetic forms (e.g. color mutants) and hybrids. Plants such as f. *elongata*, which have been consistently found on the same rhizome as the typical form, raise considerable question as to the desirability of assigning a formal name to the variant branch. Perhaps the best treatment is simply to note the occurrence of this sort of variation in the species description.

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